Application Notes

hp StorageWorks Data Replication Manager for Sun Solaris 7 and 8 with VERITAS Volume Manager 3.x

Product Version: ACS Version 8.7P

Fourth Edition (March 2004)

Part Number: AA-RQ6AD-TE

This document provides a general description of how VERITAS Volume Manager interacts with HP StorageWorks Data Replication Manager (DRM). It also details the differences in DRM configuration and failover/failback procedures required when using VERITAS Volume Manager in the DRM environment, and describes several options for managing storage. This document references procedures in the March 2004 release of the *HP StorageWorks Data Replication Manager HSG80 ACS Version 8.7P Failover/Failback Procedures Guide*, part number AA-RPJ0E-TE.

For the latest version of these application notes and other Data Replication Manager documentation, access the website at http://h18000.www1.hp.com/products/sanworks/drm/index.html. Click the **technical documentation** link and the technical support page is displayed. Click **manuals (guides, supplements, addendums, etc)** for a listing of related documentation.

Data Replication Manager for Sun Solaris 7 and 8 with VERITAS Volume Manager 3.xApplication Notes
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About This Document

This application note covers the following topics:

Intended Audience

This document is intended for current Data Replication Manager (DRM) users who:

- Are using Sun Solaris 7 or 8 (32-bit or 64-bit) as the operating system for one or more hosts in their storage area network (SAN),
- Are using VERITAS Volume Manager 3.x to manage storage through their Sun Solaris hosts, and
- Are following the failover and failback procedures in the March 2004 release of the *HP StorageWorks Data Replication Manager HSG80 ACS Version 8.7P Failover/Failback Procedures Guide*, part number AA-RPJ0E-TE.

Related documentation

The following documents provide helpful information for running your DRM solution:

- *HP StorageWorks Data Replication Manager HSG80 Version 8.7P Configuration Guide*, part number AA-RPHZF-TE
- *HP StorageWorks Data Replication Manager HSG80 Version 8.7P Failover/Failback Procedures Guide*, part number AA-RPJ0E-TE
- *HP StorageWorks Data Replication Manager HSG80 ACS Version 8.7P Design Guide Reference Guide*, part number AA-RQ78C-TE
- *VERITAS Volume Manager 3.1 Administrator's Guide—Solaris*, part number 30-000000-399
- *VERITAS Volume Manager 3.1 Reference Guide—Solaris*, part number 30-000001-399
- *VERITAS Volume Manager Storage Administrator 3.1 Administrator's Guide—Solaris*, part number 100-001722

Introduction

Many Sun Solaris storage area network (SAN) administrators use VERITAS Volume Manager to administer storage on their DRM solution. VERITAS Volume Manager groups the storage into pools of free space, called *disk groups*, which can then be divided into mountable volumes.

By creating the volumes, VERITAS Volume Manager affects how storage is presented to the hosts. This has an impact on DRM configuration and failover/failback procedures. Specifically, when you execute a failover, failback, or role reversal procedure, you will need to perform some additional steps to make the volumes visible to the host.

This document first presents information on how your DRM configuration may be affected by the use of VERITAS Volume Manager. It then provides additional steps needed to import, deport, mount, unmount, and force import volumes when using Volume Manager. These additional steps are required in 6 of the 11 failover and failback procedures in the *HP StorageWorks Data Replication Manager HSG80 ACS Version 8.7P Failover/Failback Procedures Guide*.

Finally, this document discusses VERITAS Volume Manager and three methods for administrating DRM-based storage under the Volume Manager. You will need to use one of the three administration methods to perform the additional steps to import, deport, mount, unmount, and force import volumes.

About Data Replication Manager

DRM provides a disaster-tolerant solution through the use of hardware redundancy and data replication across multiple sites. The sites can be near each other or separated by some distance.

A single DRM configuration requires two HSG80 Array Controller subsystems—one at the local or initiator site, and one at the remote or target site. For installations with multiple initiator subsystems, there must be an equal number of unique target sites, one per pair of initiator controllers.

A DRM configuration consists of paired sites. The *initiator* site carries out primary data processing. *Target* sites are used for data replication. Data processing occurs at the initiator site and the data is replicated or mirrored to the target sites. If a significant failure occurs at the initiator site, data processing can be resumed at the target sites, where the data is intact.

DRM uses the peer-to-peer remote copy function of the HSG80 controller to achieve data replication. HSG80 controller pairs at the initiator site are connected to their partner HSG80 controller pairs at the target site. Remote copy sets are created from units at the initiator and target sites. These remote copy sets contain storage devices that are mirrors of each other. As data is written to a unit at the initiator site, it is mirrored to its remote copy set partner unit at the target site.

DRM requires hardware redundancy. In the event of single component failure at a site, DRM fails over to a redundant component at that site to allow continued operations. For example, if one of the dual-redundant Fibre Channel links between the sites fails, DRM switches the data to the other fabric.

About VERITAS Volume Manager

VERITAS Volume Manager is an online storage management tool for enterprise computing and SAN environments. It allows online administration from a single management console across multiple hosts and disk storage configurations.

Through the support of RAID redundancy techniques, VERITAS Volume Manager protects against disk and hardware failures and lets users extend the capabilities of existing hardware. VERITAS Volume Manager provides a logical volume management layer, spanning volumes across multiple spindles, overcoming the physical restriction imposed by hardware disk devices.

DRM Configuration Variations

Keep the following points in mind when installing VERITAS Volume Manager.

Installing VERITAS Volume Manager First

Installing VERITAS Volume Manager can greatly impact your existing file systems. Use care when performing this installation.

Caution: HP recommends that you install VERITAS Volume Manager *before* you make major configuration changes or install other software, such as the HSG80 platform kit for Sun Solaris, or Secure Path for Sun Solaris. If an error occurs during VERITAS Volume Manager installation, then all existing file systems may be lost.

Grouping Internal and External Storage in Disk Groups

To simplify your DRM configuration, HP recommends that you group internal storage only with internal storage, and group external storage only with external storage. If you create a disk group with storage that is internal to the host, and group it with storage in an external HSG80 subsystem, you will not be able to deport and import the disk group between the initiator and target sites.

Disabling Dynamic Multipathing

VERITAS Volume Manager Dynamic Multipathing (DMP) must be disabled to avoid interference with Secure Path for Sun Solaris. Disabled is the default setting. If you have enabled DMP, follow the instructions in the *VERITAS Volume Manager 3.1 Administrator's Guide—Solaris* document to disable DMP.

Augmented Failover, Failback, and Role Reversal Procedures

Throughout the failover, failback, and role reversal procedures in the March 2004 release of the *HP StorageWorks Data Replication Manager HSG80 ACS Version 8.7P Failover/Failback Procedures Guide*, you are instructed to remove host access at certain points in the procedures, and to enable host access at other points. Because you are using VERITAS Volume Manager to manage your storage units, you need to be aware of the special handling required of the volumes before and after you perform the failover, failback, and role reversal procedures. You will need to perform several extra steps to import, deport, mount, unmount, force import, or check volumes.

Before removing host access to the storage units, as you would do prior to performing a planned failover or role reversal, you will need to remove access from VERITAS Volume Manager. To cleanly remove access from a host that has access to disks under VERITAS Volume Manager control, you will first unmount all of the volumes under a disk group, then deport the disk group. This will enable you to disable the host access without unintended consequences.

Be aware that if you deport a disk group, and there is an entry in the */etc/vfstab* file to mount a volume from that disk group upon host boot, then the host will give an error during the boot sequence because it cannot find the volume. To prevent this from occurring, comment out the line for that particular volume in the */etc/vfstab* file.

After you have enabled host access from the controllers, as you would do at the target site after a planned failover or role reversal failover procedure, or at the initiator site after a failback or role reversal failback procedure, you must then place the volumes back under the control of VERITAS Volume Manager. To give VERITAS Volume Manager access to the volume, you will need to first import the disk group that the volume was under, and then mount the volume. The I/O operations at the site can then be restarted.

The procedures for an unplanned failover are different from those for a planned failover. When an unplanned failover occurs, and the volume was not deported from the initiator, the volume still has the initiator host label on it. To allow target access to the volume, you will need to import the volume by performing a forced import and using the clear host ID option. After you have successfully forced the import of the volume, you will need to check the volume's file system with the *fsck* utility. When the *fsck* function has completed, you can then start and mount the volume, and begin I/O processes.

Definitions of Volume Manager Terms

Import—Bring a deported disk group and its Volume Manager objects into a system from another system.

Deport—Move a disk group and its Volume Manager objects out of the current system. The group and its disks can then be used in another system.

Mount—Attach a file system to the file system hierarchy at the mount point, which is the pathname of the directory (gains access to the read and write functions of a hard drive).

Unmount—Unattach a currently mounted file system (removes access to the read and write functions of a hard drive).

Force import—Bring a disk group and its Volume Manager objects into a system without having the diskgroup first deported from the previous system.

Check volumes (*fsck*)—Check and repair file systems. The *fcsk* function audits and interactively repairs inconsistent file system conditions.

Specific Additional Procedural Steps

When performing the following procedures in the March 2004 release of the *HP StorageWorks Data Replication Manager HSG80 ACS Version 8.7P Failover/Failback Procedures Guide*, you will need to add additional steps, as shown below.

Chapter 2: Unplanned Site Failover with Full Failback Procedure

- On page 31, perform the following additional target site tasks at the end of the Sun Solaris-specific operations in step 12h:

  Import the disk groups using the forced import with the clear host ID flag option. Start the volumes, if not already started. Check the volumes using *fsck*, then mount the volumes.

- On page 38, perform the following additional target site tasks at the end of step 9:

  Unmount the volumes, then deport the disk groups.

- On page 46, perform the following additional initiator site tasks at the end of the Sun Solaris-specific operations in step 10h:

  Import the disk groups. Start the volumes, if not already started, then mount the volumes.

Chapter 3: Resumption of Operations After Unplanned Loss of Target Site: Failsafe Mode Procedure

No additional steps are required.

Chapter 4: Resumption of Operations After Unplanned Loss of Target Site: Normal Mode Procedure

No additional steps are required.

Chapter 5: Short Planned Site Failover with Fast Failback Procedure

- On page 61, perform the following additional initiator site tasks prior to the Sun Solaris-specific operations in step 3h:

  Unmount the volumes, then deport the disk groups.

- On page 74, perform the following additional target site tasks at the end of the Sun Solaris-specific operations in step 9h:

  Import the disk groups. Start the volumes, if not already started, then mount the volumes.

- On page 75, perform the following additional target site tasks prior to performing the operations in step 3:

  Unmount the volumes, then deport the disk groups.

- On page 80, perform the following additional initiator site tasks at the end of the Sun Solaris-specific operations in step 8h:

  Import the disk groups. Start the volumes, if not already started, then mount the volumes.

Chapter 6: Resumption of Replication After Short Planned Loss of Target Procedure

No additional steps are required.

Chapter 7: Extended Planned Site Failover With Full Failback Procedure

- On page 91, perform the following additional initiator site tasks prior to the Sun Solaris-specific operations in step 3h:

  Unmount the volumes, then deport the disk groups.

- On page 100, perform the following additional target site tasks at the end of the Sun Solaris-specific operations in step 5h:

  Import the disk groups. Start the volumes, if not already started, then mount the volumes.

- On page 105, perform the following additional target site tasks at the end of step 1:

  Unmount the volumes, then deport the disk groups.

- On page 113, perform the following additional initiator site tasks at the end of the Sun Solaris-specific operations in step 9h:

  Import the disk groups. Start the volumes, if not already started, then mount the volumes.

Chapter 8: Resumption of Replication After Extended Planned Loss of Target Procedure

No additional steps are required.

Chapter 9: Unplanned Site Failover With Failback To New Hardware Procedure

- On page 131, perform the following additional target site tasks at the end of the Sun Solaris-specific operations in step 14h:

  Import the disk groups using the forced import, with the clear host ID flag. Start the volumes, if not already started. Check the volumes using *fsck*, then mount the volumes.

- On page 156, perform the following additional initiator site tasks at the end of the Sun Solaris-specific operations in step 14h:

  Import the disk groups. Start the volumes, if not already started, then mount the volumes.

Chapter 10: Planned Site Role Reversal Procedure

- On page 159, perform the following additional initiator site tasks prior to the operations in the Sun Solaris-specific operations in step 3h:

  Unmount the volumes, then deport the disk groups.

- On page 169, perform the following additional target site tasks at the end of the Sun Solaris-specific operations in step 6h:

  Import the disk groups. Start the volumes, if not already started, then mount the volumes.

- On page 170, perform the following additional target site tasks prior to step 1:

  Unmount the volumes, then deport the disk groups.

- On page 174, perform the following additional initiator site tasks at the end of the Sun Solaris-specific operations in step 6h:

  Import the disk groups. Start the volumes, if not already started, then mount the volumes.

Administering VERITAS Volume Manager

There are three principal methods of administering VERITAS Volume Manager:

- Command line entries at the UNIX prompt
- Text menu commands
- VERITAS Volume Manager Storage Administrator

Command Line Entries at the UNIX Prompt

You can perform all necessary commands for managing your DRM storage units by entering the appropriate UNIX vx commands.

To deport a disk group through command lines, use the following commands:

```
# unmount <mounted volume path>
# vxdg deport <diskgroup>
```

To import a disk group through command lines, use the following commands:

```
# vxdg import <diskgroup>
# vxvol start <volume>
# mount/dev/vx/dsk/<diskgroup>/<volume> /<mountpoint>
```

To force an import of a disk group and clear the host ID through command lines, use the following commands:

```
# vxdg import -f -C <diskgroup>
# fsck /dev/vx/rdsk/<diskgroup>/<volume>
# vxvol start <volume>
# mount/dev/vx/dsk/<diskgroup>/<volume>/<mountpoint>
```

Other helpful commands for listing disk groups and viewing their status through command lines are:

```
# vxdisk -s list
# vxprint -g <diskgroup> -vt <volume>
# vxstat
```

Use the `man vxdg` and `man vxvol` commands to see the online documentation pages for these commands.

VXDISKADM Text Menu Commands

Another tool for performing administrative tasks for VERITAS Volume Manager is *vxdiskadm*. This is a text-based, menu-driven utility that presents a list of tasks that you can perform on your disk groups and volumes.

When you invoke *vxdiskadm*, you will see a screen similar to this:

```
Volume Manager Support Operations
Menu: VolumeManager/Disk

 1       Add or initialize one or more disks
 2       Encapsulate one or more disks
 3       Remove a disk
 4       Remove a disk for replacement
 5       Replace a failed or removed disk
 6       Mirror volumes on a disk
 7       Move volumes from a disk
 8       Enable access to (import) a disk group
 9       Remove access to (deport) a disk group
 10      Enable (online) a disk device
 11      Disable (offline) a disk device
 12      Mark a disk as a spare for a disk group
 13      Turn off the spare flag on a disk
 14      Unrelocate subdisks back to a disk
 15      Exclude a disk from hot-relocation use
 16      Make a disk available for hot-relocation use
 list    List disk information


 ?       Display help about menu
 ??      Display help about the menuing system
 q       Exit from menus

Select an operation to perform:
```

You can perform import or deport operations from these menu options.

Refer to the *man* pages on *vxdiskadm* for more information on text menu commands.

Volume Manager Storage Administrator (VMSA)

VMSA is the graphical user interface (GUI) for VERITAS Volume Manager. You can use VMSA to administer disks, volumes, and file systems on local or remote machines.

VMSA is a Java-based interface that consists of a server and a client. The VMSA server runs on a UNIX machine that is running VERITAS Volume Manager. The VMSA client runs on any machine that supports the Java Runtime Environment.

Because of its ease of use, HP recommends that you use this utility for managing your VERITAS Volume Manager-based DRM storage.

Starting VMSA

To start VMSA, type `vmsa` at a UNIX command prompt from the local UNIX client and log into the host. You will see the VMSA main window, as shown in Figure 1.

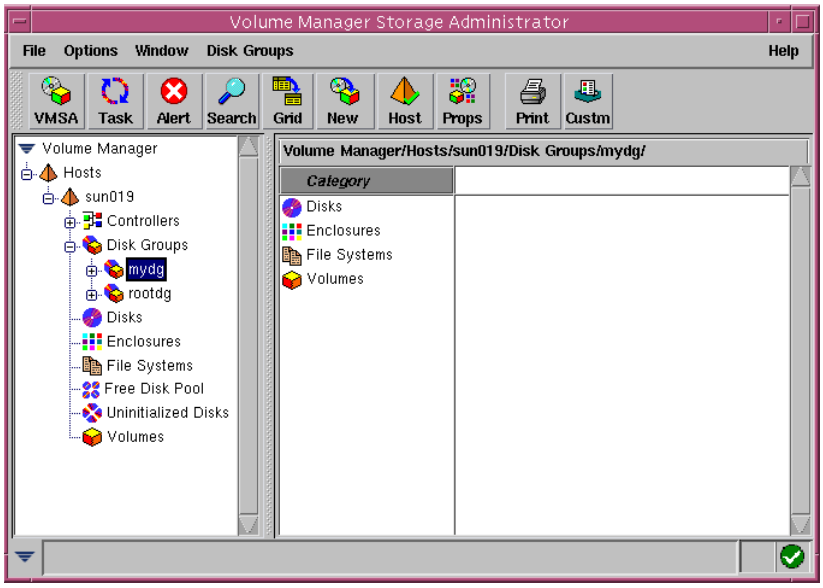

Figure 1: VMSA main window

The main window shows a hierarchical list of objects, and a grid of the objects and their properties. From this window you can select commands to unmount, deport, import, mount, force import, and use *fsck* to check the status of storage units.

Unmounting a Volume

To unmount a volume:

1. Click the disk group to which the volume belongs, in the left pane.
2. Select **Volumes** under that disk group's icon.
3. Right-click the volume to be unmounted.
4. Choose **File System > Unmount**, as shown in Figure 2.

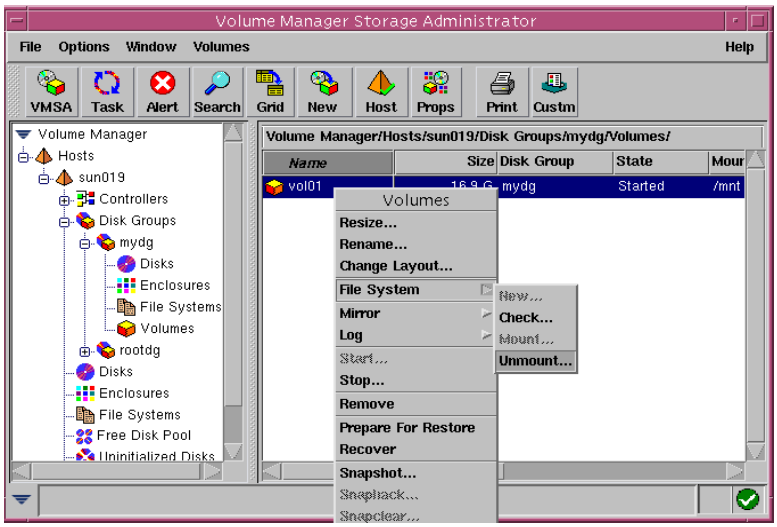

Figure 2: Unmount File System window

You will see a display similar to that in Figure 3.

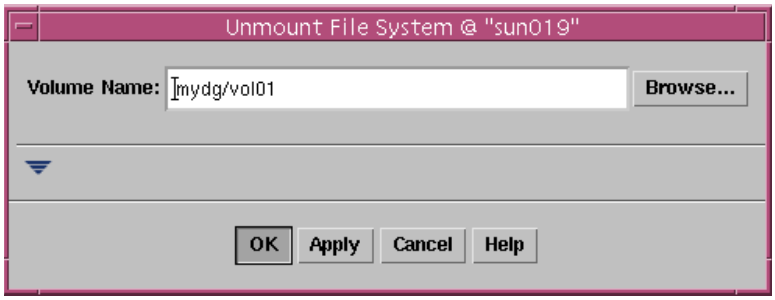

Figure 3: Unmount File System confirmation window

5. Click **OK** to unmount the volume.

Deporting a Disk Group

To deport the disk group:

1. Right-click the disk group.
2. Select **Deport**, as shown in Figure 4.

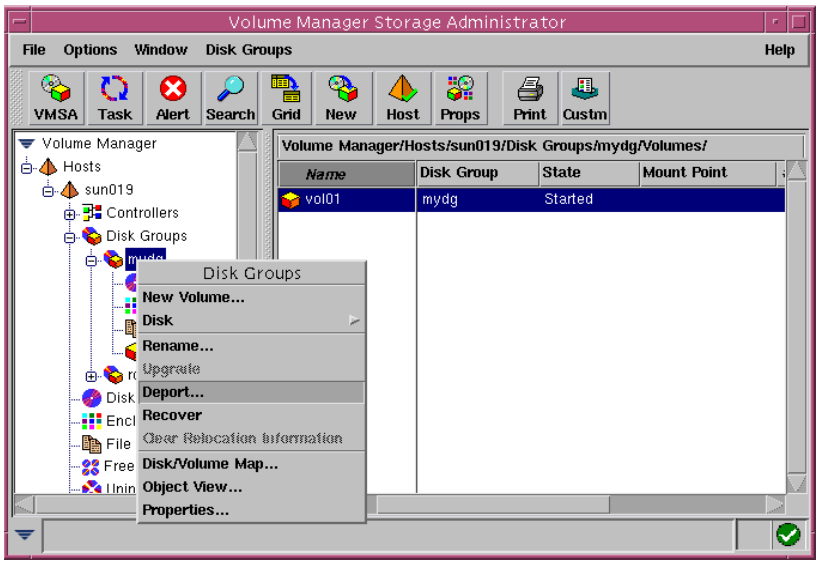

Figure 4: Deport Disk Groups windows

You will see a display similar to that in Figure 5.

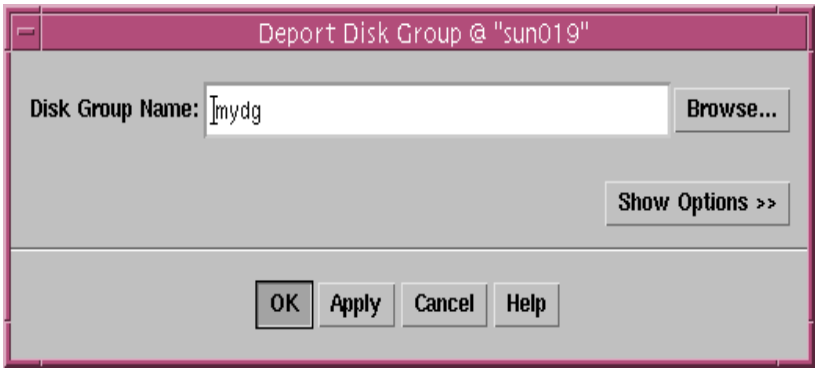

Figure 5: Deport Disk Group confirmation window

3. Click **OK** to deport the disk group. When the disk group is deported, you can then disable host access from the controllers and continue with the failover or failback operation.

Importing a Disk Group

To import a disk group:

1. Right-click **Disk Groups**, and then Select **Import Disk Group,** as shown in Figure 6.

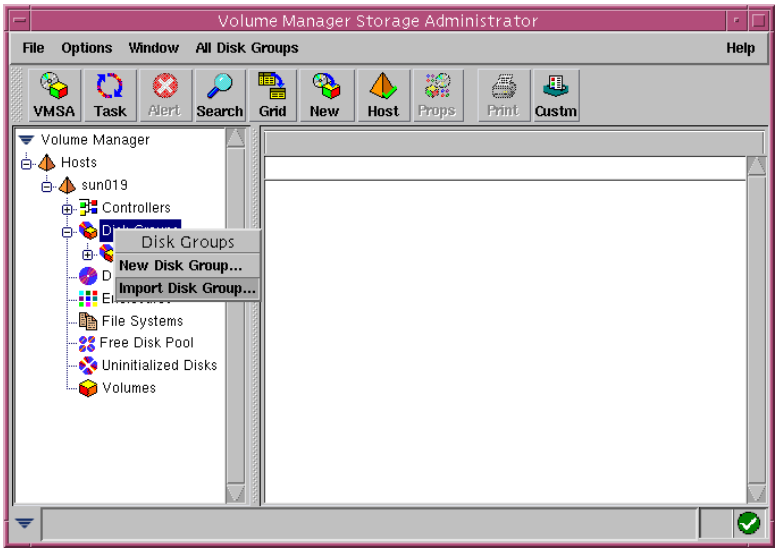

Figure 6: Import Disk Group window

You will see a dialog box similar to that in Figure 7.

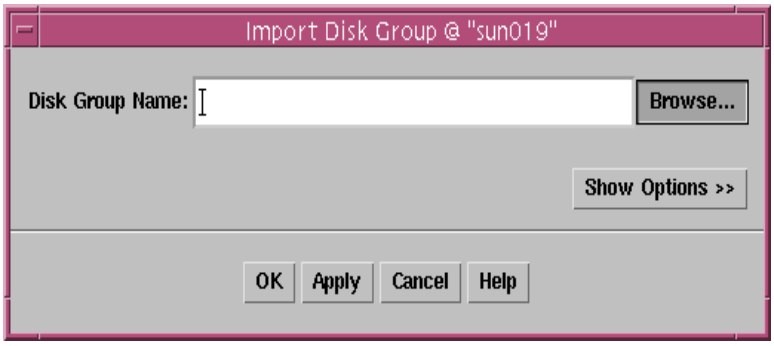

Figure 7: Import Disk Group Browse window

2. Click **Browse** and select the disk group to be imported, as shown in Figure 8.

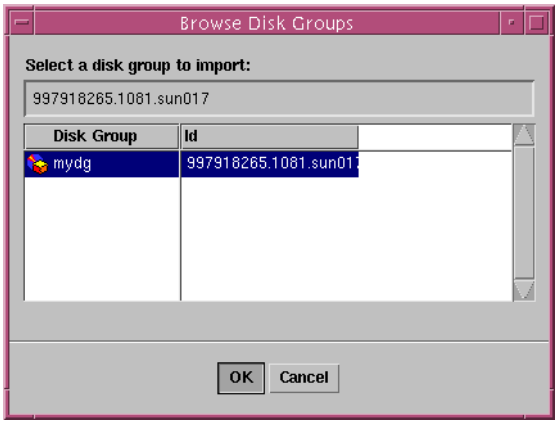

Figure 8: Browse Disk Groups window

3. Click **OK**. You will see a display similar to that in Figure 9.

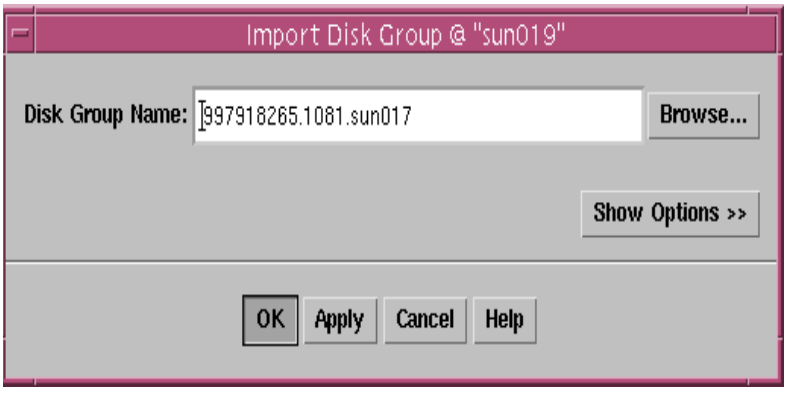

Figure 9: Import Disk Group confirmation window

4. Click **OK** to import the disk group.

Mounting the Volume

When the disk group is imported, you can mount the volume. To mount the volume:

1. Select **Volumes** under the diskgroup's icon.
2. Right-click the volume you wish to mount, as shown in Figure 10.

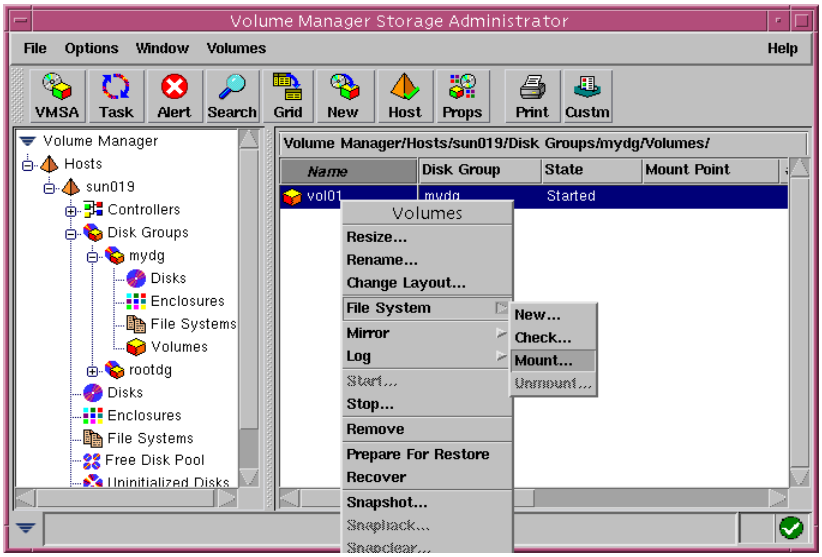

Figure 10: File System Mount window

3. Choose **File System > Mount**.

   You will see a display similar to that in Figure 11.

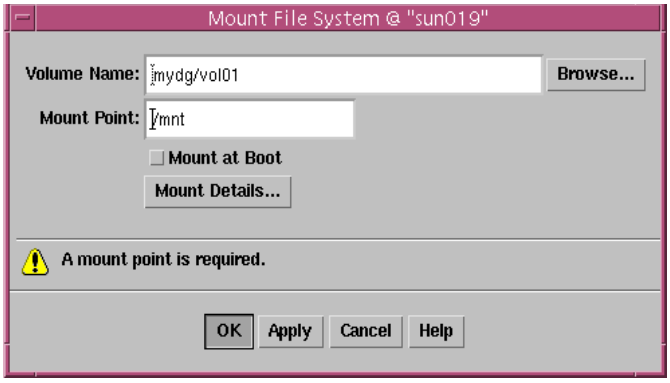

Figure 11: File System Mount confirmation window

4. Click **OK** to mount the volume.

Importing with a Forced Import

If errors occur when you attempt to import a disk group, you will need to use import with a forced import and clear the host ID selected.

1. At the dialog box for importing the disk group, click **Show Options**. You will see a display similar to that in Figure 12.

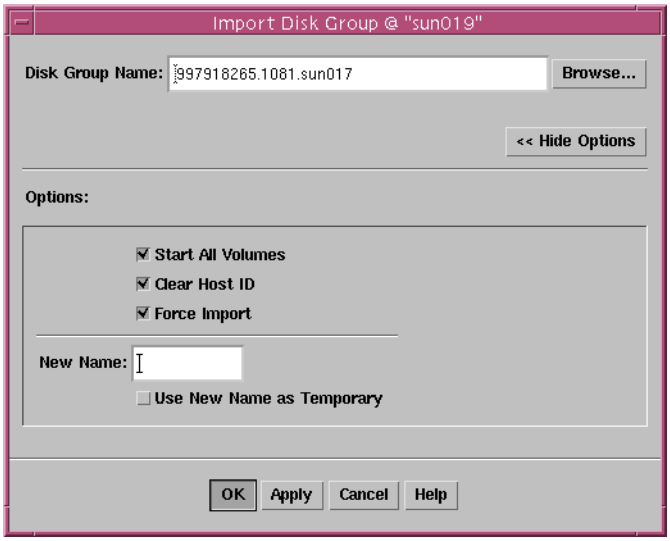

Figure 12: Force Import Disk Group window

2. Check the boxes for **Clear Host ID** and **Force Import**, then browse for your disk group.
3. Click **OK** to force import of the disk group.

Checking the File System

When the disk group is imported, check the file system on the volumes:

1. Select **Volumes** under its disk group
2. Right-click the volume.
3. Choose **File System > Check**, as shown in Figure 13.

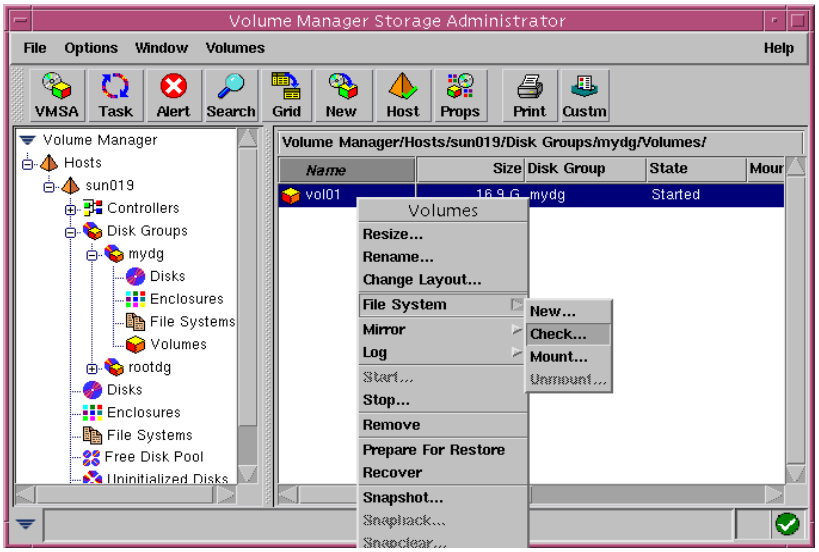

Figure 13: File System Check window

You see a display similar to that in Figure 14.

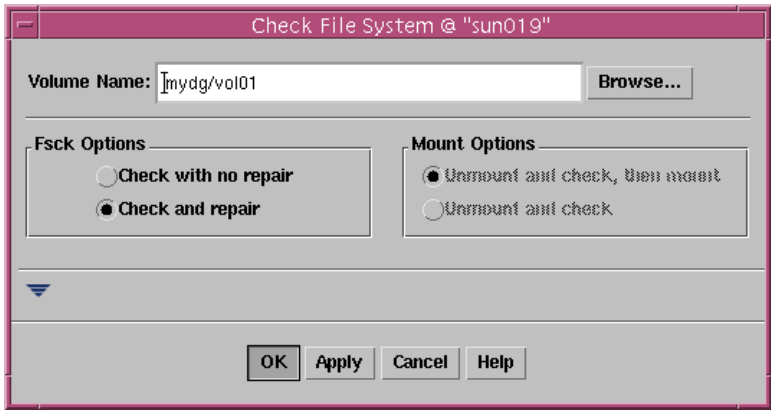

Figure 14: File System Check confirmation window

4. Click **OK** in the dialog box to begin checking the file system.

Mounting the Forced Import Volume

When the check is finished, you can mount the volume.

1. Right-click the volume.
2. Choose **File System > Mount**, as shown in Figure 15.

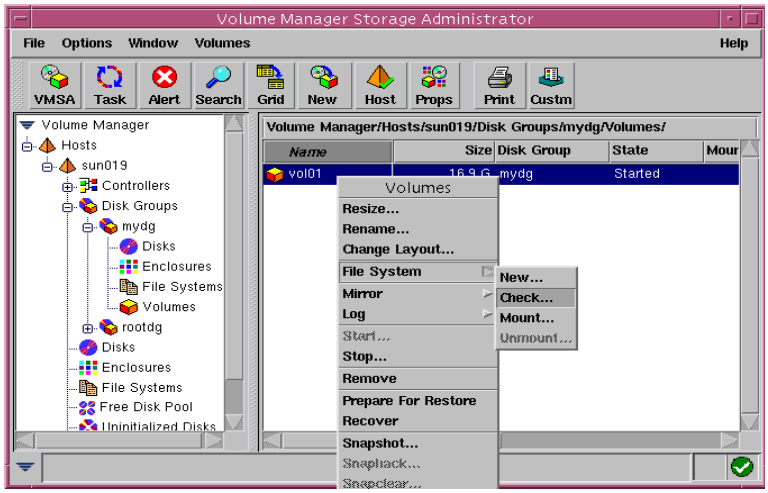

Figure 15: File System Mount window

You will see a display similar to that in Figure 16.

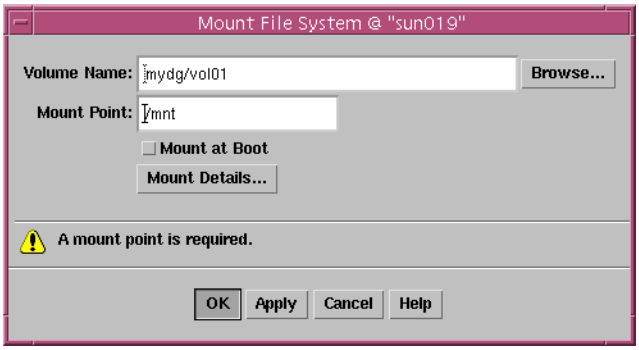

Figure 16: File System Mount confirmation window

3. Click **OK** to mount the volume.

Refer to the *VERITAS Volume Manager Storage Administrator 3.1 Administrator's Guide—Solaris* for detailed information on performing the preceding tasks.